

Claims

1. A manufacturing method of a semiconductor device, comprising:
 - (a) forming an element isolation region and an active region, electrically isolated by the element isolation region, on a semiconductor layer; and
 - (b) forming a resistive impurity layer, at least, in a part of the active region by forming a first impurity-doping region, and providing a first impurity-doping forbidden region in the element isolation region at the same time.
2. The manufacturing method of the semiconductor device according to the claim 1, wherein a plurality of the resistive impurity layers are formed, and the first impurity-doping forbidden region is formed so as to isolate, at least, the adjacent first impurity-doping regions in the (b).
3. The manufacturing method of the semiconductor device according to the claim 1 or claim 2, further comprising:
 - (c) forming a contact impurity layer by forming a second impurity-doping region in a region, continuously connected to the resistive impurity layer.
4. The manufacturing method of the semiconductor device according to the claim 3, wherein a second impurity-doping forbidden region is provided, at least, in the element isolation region when forming the second impurity-doping region in the (c).
5. The manufacturing method of the semiconductor device according to the claim 4, wherein a plurality of the contact impurity layers are formed, and the second impurity-doping forbidden region is formed so as to isolate, at least, the adjacent second impurity-doping regions in the (c).
6. A manufacturing method of a semiconductor device, comprising:
 - (a) forming an element isolation region and an active region, electrically isolated by the element isolation region, on a semiconductor layer;
 - (b) forming a resistive impurity layer, at least, in a part of the active region by forming a first impurity-doping region; and
 - (c) forming a contact impurity layer by forming a second impurity-doping region in a region, continuously connected to the resistive impurity layer, and providing a second impurity-doping forbidden region, at least, in the element isolation region at the same time.
7. The manufacturing method of the semiconductor device according to the claim 6, wherein a plurality of the contact impurity layers are formed, and the second impurity-doping forbidden region is formed so as to isolate,

at least, the adjacent second impurity-doping regions in the (c).

8. A manufacturing method of a semiconductor device, in which a resistive impurity layer formed in an active region, and an insulation gate type heavy insulated transistor and an insulation gate type light insulated transistor having different drain-source breakdown voltages, are integrated on a same semiconductor layer, comprising:

(a) forming an element isolation region and an active region, electrically isolated by the element isolation region, on the semiconductor layer;

(b) forming an insulation layer above the semiconductor layer;

(c) forming a resistive impurity layer, at least, in a part of the active region by forming a first impurity-doping region in a forming region for the resistive impurity layer, and providing a first impurity-doping forbidden region in the element isolation region at the same time;

(d) forming a gate insulation layer of the heavy insulated transistor in a forming region for the heavy insulated transistor by patterning the insulation layer to a predetermined shape, and removing the insulation layer in forming regions for the light insulated transistor and the resistive impurity layer;

(e) forming a gate insulation layer of the light insulated transistor in the forming region for the light insulated transistor;

(f) forming a gate conductive layer of the each transistor on the first gate insulation layer and the second gate insulation layer; and

(g) forming a source/drain region of the each transistor by doping a second impurity.

9. The manufacturing method of the semiconductor device according to the claim 8, wherein the source/drain region of the each transistor is formed by doping the second impurity, and a contact impurity layer is formed in a region, continuously connected to the resistive impurity layer, in the forming region for the resistive impurity layer in the (g).

10. The manufacturing method of the semiconductor device according to the claim 9, wherein a second impurity-doping region is provided, at least, in the active region in the forming region for the resistive impurity layer when doping the second impurity, and a second impurity-doping forbidden region is provided, at least, in the element isolation region in the (g).

11. The manufacturing method of the semiconductor device according to the claim 10, wherein a plurality of the contact impurity layers are formed, and the second impurity-doping forbidden region is formed so as to isolate, at least, the adjacent second impurity-doping regions in the (g).

12. The manufacturing method of the semiconductor device according to

any of the claims 9 through 11, wherein a plurality of the resistive impurity layers are formed, and the first impurity-doping forbidden region is formed so as to isolate, at least, the adjacent first impurity-doping regions in the (c).

13 A manufacturing method of a semiconductor device, in which a resistive impurity layer formed in an active region, and an insulation gate type heavy insulated transistor and an insulation gate type light insulated transistor having different drain-source breakdown voltages, are integrated on a same semiconductor layer, comprising:

(a) forming an element isolation region and an active region, electrically isolated by the element isolation region, on the semiconductor layer;

(b) forming an insulation layer above the semiconductor layer;

(c) forming a resistive impurity layer, at least, in a part of the active region by forming a first impurity-doping region;

(d) forming a gate insulation layer of the heavy insulated transistor in a forming region for the heavy insulated transistor by patterning the insulation layer to a predetermined shape, and removing the insulation layer in forming regions for the light insulated transistor and the resistive impurity layer;

(e) forming a gate insulation layer of the light insulated transistor in the forming region for the light insulated transistor;

(f) forming a gate conductive layer of the each transistor on the first gate insulation layer and the second gate insulation layer; and

(g) forming a source/drain region of the each transistor by doping a second impurity, as well as forming a contact impurity layer in a region, continuously connected to the resistive impurity layer, and providing a second impurity-doping forbidden region, at least, in the element isolation region at the same time.

14. The manufacturing method of the semiconductor device according to the claim 13, wherein a second impurity-doping region is provided, at least, in the active region in the forming region for the resistive impurity layer when doping the second impurity, and a second impurity-doping forbidden region is provided, at least, in the element isolation region in the (g).

15. The manufacturing method of the semiconductor device according to the claim 14, wherein a plurality of the contact impurity layers are formed, and the second impurity-doping forbidden region is formed so as to isolate, at least, the adjacent second impurity-doping regions in the (g).

16. The manufacturing method of the semiconductor device according to any of the claims 1 through 15, wherein the element isolation region is semi-recessed LOCOS.

17. A semiconductor device, comprising:
 - a semiconductor layer;
 - an insulation gate type heavy insulated transistor and an insulation gate type light insulated transistor having different drain-source breakdown voltages and formed on the semiconductor layer; and
 - a resistive impurity layer formed on the semiconductor layer.
18. The semiconductor device according to the claim 17, wherein an element isolation region and an active region, electrically isolated by the element isolation region, are formed on the semiconductor layer, and the resistive impurity layer is formed in the active region.
19. The semiconductor device according to the claim 17 or claim 18, wherein the element isolation region is semi-recessed LOCOS.